IN ALL MAMMALS:
The brain events originate in the old mammalian brain - "innate programmed behaviour"
MICE

Estrogen peaks
Progesterone falls
Pup stimulation
Rich environment

Increased spines (dendrification)
New circuits = enhanced learning

Pup stimulation
Rich environment
New circuits = enhanced learning

Increased spines (dendrification)
Estrogen peaks
Progesterone falls

Maternal neurobehaviour
Enhanced foraging
Stress responsiveness
Enhanced problem solving
More emotional resilience

Amygdala
Hippocampus
Hypothalamus
Maternal neurobehaviour
Less fear / anxiety
Better learning / memory
Better stress tolerance

Enhanced problem solving
Stress responsiveness

Enhanced foraging
More emotional resilience
PROLACTIN rises, OXYTOCIN rises, LACTATION rises. MEMORY permanently improved.

BDNF (=Brain Derived Neurotropic Factor)

Opioids
Glucocorticoids
Norepinephrine
Vasopressin (fathers specially)
e tcetera ....

MEMORY permanently improved

"The picture that begins to emerge is one of a healthy, "protected" brain that may provide benefits to its owner well into senescence." (p517)

"The combination of these ... converge to produce the most dramatic results ..."

Maternal neuro-behaviour
→ More emotional resilience
→ Enhanced problem solving
→ Better stress tolerance
→ MEMORY permanently improved.....

Viewing the maternal experience as an enriching complex experience ... suggests that the effects on brain and behaviour may be real, meaningful, pervasive and persistent...... (Rats, how much more for people!!!)

'MOTHERING' = politically incorrect terminology ...
(parenting, care-giving)
culturally not valued .... BUT
neuroscience provides new understanding and definitions .. biologically based survival requirement →

'MOTHERING' = biological definition

basic needs of infants arise from their biology
Mothering is biology

We need to integrate these aspects for baby:
Development of:
- Physical
- Emotional
- Mental
- and Social, cultural, spiritual....

& help parents to do so! HOW? Practically?
Skin-to-skin contact or KMC

WHY IS IT SO IMPORTANT??
To get the start of life right for stability and growth of:
- Physical
- Emotional
- Mental development

To help the baby set healthy balance for life!
This only happens if the baby feels SAFE
‘MOTHERING’ = biological definition
breastfeeding
carrying
secure attachment
mutual reward
enjoyment and empathy
mutual playfulness and joy
ALL have evidence-based science

The first hours after birth are a CRITICAL PERIOD
mutual
psycho-neuro-physiological
caregivers

Target #1 for 2005:
Report that 65% of infants are placed and remain in
direct skin to skin contact
with their mothers
for at least one hour
during the first 3 hours after birth.

“The newborn may appear helpless, but
skin-to-skin contact
stimulates prolactin
ensures nutrition
stimulates oxytocin
ensures protection
stimulates cholecystokinin
ensures wellbeing bonding

More skin-to-skin → more breastfeeding

HORMONES (peaks & falls)
NEURONS PRIME (e.g. dendrification)
SALIENT stimulation
Rich environment
New circuits = enhanced learning
Advanced behaviour

SALIENT stimulation
Rich environment
New circuits = enhanced learning
Advanced behaviour
Critical period concept:

"Windows of opportunity in early life when a child's brain is exquisitely primed to receive sensory input in order to develop more advanced neural systems."

Centrally released oxytocin coordinates the onset of maternal nurturing behavior at parturition and plays a role in mother-infant bonding.

Brain-to brain
Face-to-face
Eye-to-eye
voice, hands, movements

In humans, oxytocin increases gaze to the eye region of human faces and enhances interpersonal trust and the ability to infer the emotions of others from facial cues.

Learning affective values for faces is expressed in amygdala and fusiform gyrus

Psalm 22 v 9

“I learnt trust on my mother’s breasts”
Psalm 22 v 9
“I learnt trust on my mother’s breasts”

“trust” (aš) to lie for refuge; figuratively to trust, be bold (confident, secure, sure), (make to hope, make to trust.)

“breast” (shōd) the breast of a woman or animal (as bulging): - breast, pap, teat.

When oxytocin is released within the brain, its effects are to diminish fearfulness:

PREDATOR + OXYTOCIN
Smell cingulate
FEAR suppressed
FORAGE

After a lengthy bureaucratic struggle, Margaret and Yves became the first parents in New York and the second parents in the U.S. to take home a child on life support. “The process transformed my personality,” says Margaret. “I had been a shy and timid person, and I became brassy and obnoxious. I changed into a beast to protect my child.”

Measure of a “good mammal mother”: FEROCITY OF DEFENCE OF YOUNG.

Margaret Mikol
“I changed into a beast to protect my child”

Measure of “good mammal mother”: FEROCITY OF DEFENCE OF YOUNG

Sodersjukhuset, Stockholm
Randomisation to new and old unit

Modern day maternal ferocity ???

Replaced by
subservient inheritance!
thankfulness, staff “own the baby”

Personal testimony of a mother at International KMC Workshop

“The instinct of a mother to hold and care for her baby is primordial and primitive, and an overwhelmingly powerful feeling.”

Jane Davis, Bogota, Dec 1998
In the FIRST HOUR ......
..... the newborn
ELICITS CARE GIVING
INSTINCTUAL
BEHAVIOUR FROM
THE MOTHER !!
Your Baby's Brain: the latest neuroscience

4. YOUR parenting brain

Baby's brain is wired by Mother!

Father's role in this neuroscience

Attachment and "developmental parenting"

WHAT IS NORMAL MOTHER BEHAVIOUR?
WHAT IS NORMAL FATHER BEHAVIOUR?

THE HUNTER GATHERER

Homo sapiens evolved as a "tropical hunter gatherer".

Anthropological studies of current tropical societies:
20% of diet from hunting mammals,
40-60% from gathering foods
Both hunting and gathering require mobility.

WHAT IS NORMAL FATHER BEHAVIOUR?

The reproductive programme is in the mother and the baby

WHAT IS NORMAL MOTHER BEHAVIOUR?

Infant care patterns in such societies
(which are closest to our origins):

1. Infant carried most of time
2. Mother sleeps with infant same bed
3. Immediate feeding response to crying
4. Breastfeeding 24 months or more
5. Father frequently and closely involved...

THE HUNTER GATHERER (cont)

Infant care patterns in such societies

Parental behavior involves homologous neuroendocrine circuits in male and females,
- The behavior exhibited by human fathers at their first contact with the young was studied on 15 fathers of full-term infants delivered by cesarean section. The naked infant was presented to the father approximately 15 min after delivery, and photographs were taken every second during the first 7 min of contact.
**Fathers??**

- An orderly progression of behavior was observed: the father began touching the extremities, and then proceeded to touch the infant with his fingers and fingertips.
- Then to use his palms and finally the dorsal side of his fingers.
- An increase in eye-to-eye contact over time was observed.
- It was concluded that the father displayed a very similar behavior, in his first contact with the young, as has been described previously for the mother.

**Prem birth:**

Mothers experienced a need to regain the temporarily lost relationship with their child, whereas the fathers experienced the beginning of a new relationship.

Mothers engaged in more caregiving, talking, and holding during initial contacts, but the disparity in maternal and paternal interactions decreased with time. Except for caregiving, in which mothers still surpassed fathers, fathers equaled mothers in all other activities at the time of the infants’ discharge from the hospital.

Fathers consistently surpassed mothers in playing and stimulating.

**proximity, gaze, touch, and movement.**

The analysis showed that proximity and gaze were high-frequency behaviors and touch and movement were low-frequency behaviors.

**After C/S**

29 pairs skin-to-skin with father or next to father in cot.

Father infants drowsy within 60 minutes.

Father infants cried less (p<0.001)

Crying stopped within 15 minutes.

Infants in a cot reached after 110 minutes.

Rooting activity was more frequent in the cot group than in the skin-to-skin group (p < 0.01), as were sucking activities (p < 0.001)

**Taken by surprise:**

For mothers, the premature birth created a feeling of powerlessness and they experienced the immediate postnatal period as surreal and strange. The fathers experienced the birth as a shock, but were ready to be involved immediately.
both mothers and fathers rated their experiences of love significantly higher when holding their infants skin to skin than when holding their infants wrapped in blankets.

Differences two types of holding:
- mothers p= 0.0002
- fathers p= 0.0001

Title:
Prolactin and testosterone levels in first-time fathers with skin-to-skin contact with their babies soon after birth.

Hypothesis
Skin-to-skin contact with their new-born babies should elicit a prolactin spike in human fathers, and also decrease serum levels of testosterone.

Spike seen once!!
Prolactin half life very short
Indwelling cannula, every 15min
NOW RECRUITING !!!!!!!!
Please contact Nils

PARTNERS ??
PLAYMATES ??
Fathers consistently surpassed mothers in playing and stimulating.
Levy-Schiff 1989

PROTECTORS ??
Birth period ➔
Keep intruders away during bonding ....
Your Baby’s Brain: 
the latest neuroscience

4. YOUR parenting brain
Baby’s brain is wired by Mother !
Father’s role in this neuroscience
Attachment and
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Promoting parenting skills
(Both Mum and Dad!)

Holding & carrying
Bonding
Eye contact
Playing games
Peek-a-boo, stories, etc

Attachment starts with Mum...
Mothers ANS helps the Baby’s ANS to find healthy set points. Baby needs mothers presence and safety to do this!
When these are settled the baby will be able to SELF REGULATE or reach stability on her own. She can cope with change and come back to

ATTACHMENT - REGULATION
the objective is to achieve the ability to establish an efficiently regulated right brain:

'STABILITY THROUGH CHANGE
The foundation for INFANT MENTAL HEALTH
Schore 2001a

“The brain is designed to be sculpted into its final configuration by the effects of early experiences”
These experiences are embedded in the attachment relationship.
Neurodevelopment
Skin-to-Skin Contact promotes APPROACH behaviour
Separated babies show AVOIDANCE poorer resilience → HARM

SEPARATION CAUSES STRESS/HARM
IN ALL NEWBORNS, ESPECIALLY FOR PREMS WHO ARE MORE FRAGILE
• Babies should NOT be left to cry themselves to sleep...
• “Sleep training” is a modern idea and “works”. But there is no scientific evidence on what effect it has on the baby’s brain.
• For a tiny baby crying can be dangerous.

“...It is an ultimate irony that at the time when the human is most vulnerable to the effects of trauma - during infancy and childhood - adults generally presume the most resilience.

Perry et al 1995

DYADIC CARE-GIVING
Nurse to support, explain, then leave the mum and baby to settle into their own routine together, to get to know each other, with dad. Old-fashioned idea of “cloistering”. REST!

• If we want to:
  • raise secure children
  • decrease violence
  . Maximise each child’s best brain potential

BUILD
Babies need BONDING TIME!
• First bond/relationship
• Most important bond
• Foundation to all other bonds
• Essential bond!
The Relation of Early Mother-Infant Skin-to-Skin Contact to Later Maternal Sensitivity in South African Mothers of Low Birth Weight Infants

Ann E. Bigelow, et al

From Bergman et al 2004 RCT
SSC time first 24 hr correlated with SSC time first month.

Bigelow study: filmed Mum &baby interactions. Mum’s emotional sensitivity helped baby be secure.
Also test for stimulation and stretching baby (cognitively): Mum was sensitive not to overwhelm baby.

Baby/infant can meet the world from a safe place. Shy → confident. Needs mum’s sensitivity to baby’s cues for rest and play. BALANCE!

Peekabo, blocks, trains, puzzles, WITH the child...
ball games, (BE completely there!)
as they grow AT THE CHILD’S PACE
hockey... rugby
Read stories...
Development...
ENJOY being parents!!

Relationships are the “Active Ingredients” of Early Experience
• Nurturing and responsive interactions build healthy brain architecture that provides a strong foundation for later learning, behavior, health.

Jack P. Shonkoff, M.D.

• “When protective relationships are not provided, persistent stress results in elevated cortisol levels that disrupt brain architecture by impairing cell growth and interfering with the formation of healthy neural circuits”

Jack P. Shonkoff, M.D.
Daycare for tiny babies and infants (pre-speech)

- Causes increased anxiety
  - Increased cortisol
  - Increased aggression and disobedience
  - Caused problems when they went to preschool and affected others in class
  - Teacher stress
  - Society stress

CONCEPTUAL VIEW OF DEVELOPMENT
ATTACHMENT creates scaffold for abstraction

INTELLIGENCE
speech
SOCIALISATION
emotional
REGULATION
autonomic
HOMEOSTASIS
brainstem
PHYSIOLOGY

The First Idea (p39)

“The symbolic use of language, in turn, creates the foundation for more advanced social and intellectual capacities, including higher and higher levels of reflective thinking.”

Neuronal Plasticity

“the first three years are decisive”

The cortex keeps some plasticity throughout life ...

But limbic system and the midbrain are fixed after the age of three years!

Neuronal Plasticity

“the first three years are decisive”

Platform for subsequent development of higher cognitive functions.

Maslow’s HIERARCHY of needs

- Represented as a pyramid with the more primitive needs at the bottom.
PLACE RELATIONSHIP

Fetus  Uterus  Mother
Newborn Chest  Mother
Infant Home  Father
Toddler Home  Family
Child Village  Community
Youth Country  Nation
Adult World  Humanity

We are not just looking at individual babies, we are looking at healthy families,
→ healthy communities,
→ healthy societies,
→ healthy countries
→ A healthy world!

How to make choices when reality is not easy?! IDEAS?!
When you can’t breastfeed… Feed at the breast
When you have to work….can you take your baby to work?
Or work part time? from home?
Can you express breastmilk if have to leave your baby?
Can you give extra skin-to-skin contact by cosleeping?
Can you try to make play time?

What does my baby’s basic biology need?
MUM!! ☺️ and Dad!!

Skin-to-skin contact → SAFE → growth
for brain-wiring
Sleep - completing brain circuits
Breastmilk:
Small feeds often(every 60-90 mins)
Bottle gets too much too fast → reflux/colic?
Bonding and attachment
No separation, no prolonged crying
Parenting is the most varied, demanding and the most rewarding job that you will ever do in your life. You can be a nurse, counsellor, referee, cook, judge, teacher and playmate all in one! You are helping a person grow!!” JB